ORIGINAL ARTICLE

Photographic wound documentation of open fractures: an update for the digital generation

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Emerg Med J 2007;**24**:841–842. doi: 10.1136/emj.2007.049726

Accepted 26 August 2007

Objective: To examine the availability of working cameras in UK emergency departments and to discuss the merits of digital imaging over Polaroid.
Design: This study was conducted by means of a telephone questionnaire to 50 UK emergency departments.
Results: It was found that 80% were able to produce either a working Polaroid or digital camera, and that 63% of emergency departments had a digital camera available.
Conclusions: We report a pronounced increase in the ability of emergency departments to photograph open fractures, due in part to the availability of digital cameras. We recommend the appropriate use of these tools in the management of open fractures.

Open fractures occur with a frequency of between 11.5–23 per 100 000 per year.[1 2] The British Orthopaedic Association and British Association of Plastic Surgeons stipulate that a crucial part of the initial management of these injuries is the photographic documentation of the open wound, before wound dressing.[1] This allows the wound to be assessed by other specialists in order to plan definitive management and subsequent reconstruction without disturbing the dressing, thus reducing the potential for wound contamination.

In 2001 Solan *et al*[3] identified a deficiency in the ability of a number of accident and emergency departments to produce a working camera upon request. Ten per cent of departments surveyed had no facility to photograph open fractures, only 71% had a camera available 24 h a day, and only 59% produced a functional camera when challenged to check that the camera was available and operational. This figure would have fallen to 39% out of hours.

In light of the increasing affordability and widespread availability of digital cameras, with the potential benefits offered over Polaroid cameras, we felt the time was right to re-investigate the facilities available to a variety of emergency departments in order to assess the response to the findings of Solan *et al*.

METHODS

A telephone questionnaire was answered by the most senior nurse on duty in 50 UK emergency departments. These were selected at random from departments across the UK with proportional representation of English, Scottish, Welsh and Northern Ireland Departments. The survey was timed to avoid the busiest times of day and to avoid the nursing handover. The senior nurse was questioned on matters pertaining to the availability of a camera, the type of camera, where the camera was kept, security measures in place, availability of the camera out of hours, and facilities for displaying photographs taken. Finally, the nurse was asked to physically locate the camera, check that the camera was in working order (that is, batteries were available and the camera would turn on) and, in the case of the Polaroid camera, that film was available.

RESULTS

The results of the questionnaire are presented in table 1. Fifty UK emergency departments were surveyed. Of these, six were unable/unwilling to participate due to workload, in spite of repeated attempts on different occasions. Of the 44 hospitals able to participate in the survey, five stated that they did not currently have photographic equipment. When challenged to physically produce the working camera, four of the remaining 39 departments were unable to produce either a digital or a Polaroid camera that worked. Thus, 35 of 44 (80%) departments surveyed had a working camera at the time of the survey.

Twenty-four of 39 departments possessed a digital camera. Of these, three were not available and/or working—one because the sister in charge was unable to operate the camera, one was locked in a consultant's office with no access to the key, and the third had run out of batteries, with no charger available. Of the 26 Polaroid cameras, five were not available and/or working. One had run out of film, the other four were lost, though this fact was not known until the time of the survey!

Of the departments possessing a digital camera, only 15 of the 24 had the facility to print hard copies of the photographs taken. All but one had facilities to transfer the pictures on to a computer and thus email to a remote location.

Regarding provision for security, only 20 out of 26 Polaroid cameras were kept locked, while 23 of 24 digital cameras were locked away.

DISCUSSION

The overall proportion of emergency departments with a camera available out of hours has increased from 39% in 2001 to 80% in 2007. A sizeable proportion of these are digital cameras.

Polaroid cameras are cheap, commonplace and easy to use. They are robust and, providing batteries and film are available, will provide a permanent visual record of an open injury which can be filed in the clinical notes. There are drawbacks though which potentially outweigh these strengths: they are reliant on expensive film and on inbuilt batteries that are rarely rechargeable, and the image quality produced tends to be fairly poor. The rapid development of digital technology with inevitable price reductions (in 2001 the average price of a 3 megapixel digital camera was £600[4] while in 2005 a 4 megapixel camera could be bought for only £60) has resulted in a huge expansion of our daily, personal use of digital cameras.

The advantages inherent in embracing the use of digital technology are numerous. Digital imaging allows both printing of hard copies, and also digital transmission (via email or telemedicine facilities) of images to a remote location.[5] This

Table 1 Full results of questionnaire

Do you have the facility to photograph open fractures?	Yes 39/44	No 5/44	
Is your camera Polaroid, digital, or do you have both?	Polaroid 15/39	Digital 13/39	Both 11/39
Is the camera stored locked?	Yes	No	
• Polaroid	20/26	6/26	
• Digital	23/24	1/24	
In theory, do you have either a Polaroid or digital camera available 24 h per day?	Yes 35/39	No 4/39	
Do you have a working camera today? (can you go and check it works)	Yes	No	
• Departments with Polaroid only	12/15	3/15	
• Departments with digital only	12/13	1/13	
• Departments with both available	11/11	0/11	
• Departments with neither available	0/5	5/5	
Total:	35/44	9/44	
Of the departments with digital cameras:			
Do you have the facility to print hard copies of the photographs?	Yes 15/24	No 9/24	
Do you have the facilities to transfer images on to a computer?	Yes 23/24	No 1/24	
As such, do you have the facility to email images to a remote location?	Yes 23/24	No 1/24	

ability, particularly when supplemented with relevant *x* rays,[6 7] has been shown to be a widely applicable, inexpensive and easily reproducible technique. This could be of great value at times when, for example, advice regarding optimal initial management is sought[5] or a referral to plastic surgeons is required for advice regarding soft tissue cover, as an adjunct to the initial soft tissue debridement. This would be useful particularly in remote regions of the UK, but also in mainland hospitals in which plastic surgery services are not readily available.

CONCLUSION

We are pleased to report a pronounced increase in the ability of emergency departments to photograph open fractures, though of concern is the finding that one in five departments still did not have this facility at the time of our survey. This increase is due in part to the increasing availability and affordability of digital cameras. These offer practical and functional advantages over Polaroid cameras.

We recommend the appropriate use of these tools in the management of open fractures, following the guidelines set out in the British Orthopaedic Association/British Association of Plastic Surgeons document.[1]

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Competing interests: None.

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